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## Biological Notes on some Hymenoptera that Nest in Sumach Pith

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In 1958 I became interested in the wasps nesting in the soft pith of scrubby staghorn sumach (*Rhus typhina*) and smooth sumach (*R. glabra*) during an effort to elucidate the biology of *Chrysis* (*Ceratochrysis*) *enuycki* Cooper and its host *Leptochilus republicanus zendaloides* (Robt.). The study on these two wasps has been reported (Krombein 1959). Information obtained on other Hymenoptera nesting in sumach pith is presented below.

The nests were obtained from sumachs growing along the right of way of the Washington and Old Dominion Railroad between Dunn Loring and Vienna in Fairfax County, Virginia. Some species burrowed into the soft pith of the stems or larger lateral branches with a diameter of 15 to 30 mm. Other species utilized pre-existing borings in the pith.

A few nests were obtained during examination of the sumachs on January 4, 1958, and March 7, 1959, but most of the nests were obtained during the summer of 1958. I topped several hundred stems and branches of smooth and staghorn sumach on June 17 in order to provide easily accessible entry to the pith. These particular sumachs were checked on July 1 and 15, August 15 and 28, September 3, 11, 19 and 26, and October 31, all stems that showed evidence of borings being gathered each date. The following notes were made from an examination of these borings and rearing of the occupants. Overwintering

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nests were left outdoors from the end of October through March 1959, and were then brought into my office; emergence dates from these nests are therefore earlier than normal.

I am indebted to the following specialists for identification of prey or parasites obtained during this study: R. M. Bohart (*Omalus*); B. D. Burks (Symphyta and Chalcidoidea); H. W. Capps (Lepidoptera); R. H. Foote (Diptera, in part); L. M. Russell (Aphidae); C. W. Sabrosky (Diptera, in part); A. Stone (Diptera, in part); H. K. Townes (Ichneumonidae); and W. W. Wirth (Diptera, in part). My daughters, Kristin and Kyra, assisted in hunting for the nests.

### ***Hemitaxonus dubitatus* (Norton)**

Larvae of this small tenthredinid sawfly pupate in borings. I believe that they probably utilize abandoned borings rather than chewing out their own, because at least one of them was at the bottom of a boring 78 mm. long. The sawfly does not spin a cocoon, but constructs a narrow plug of fine particles of pith just above itself, and occasionally also beneath itself. It does not construct a plug at the boring entrance. In one case a species of *Passalococcus* constructed a one-celled nest above the sawfly retreat. Sawfly prepupae were found in stems picked up on September 11 and 26 and October 31. Larvae of this sawfly have been recorded as feeding on *Osmunda*. However, in the locality of my research I suppose that they feed on bracken (*Pteridium*) which is common along the railroad tracks. I was successful in rearing one male sawfly (92658 D) from the few available prepupae. It pupated between April 6 and 10, and emerged on April 13.

An ichneumonid, *Cubocephalus canadensis* (Prov.), was reared from a prepupa of this sawfly (103158 E) found on October 31. The parasite had spun its cocoon inside the sawfly retreat. It transformed to a pupa on April 8, and a male emerged on April 15. Another sawfly prepupa (91158 C) found on September 11 had a slender parasite egg next to it. This egg was 1.54 mm. long and 0.28 mm. wide across the middle. It was adjacent to the thoracic legs but was not glued

to the body. It may have been an egg of *Cuboccephalus*, but unfortunately it failed to hatch.

### *Perithous mediator pleuralis* Cresson

Four males of this ichneumonid were reared from a nest (92658 B) of a species of *Pemphredon*, probably *harbecki* Roh. This nest was in a stem of staghorn sumach. The boring was 2.5 mm. wide and sinuous. It was about 32.5 cm. long with the upper 13 cm. empty except for a plug of particles of fine pith 15 mm. thick located 9 cm. from the entrance. Some of the cells were in separate pockets separated from the main boring by a plug of fine particles of pith; other cells were in a linear series in the main boring and were separated by a few millimeters of pith particles. This nest architecture is characteristic of *harbecki* rather than of *lethifer*, the other species of *Pemphredon* which nests in sumach pith in this area.

When this nest was picked up on September 26, each of two cells contained small black meconial pellets of the *Pemphredon* larva and a small larva of *Perithous* feeding on the full grown wasp larva. Another cell contained a chrysidid prepupa, probably of a species of *Omalus*, in its cocoon. I preserved a mature wasp larva and samples of the aphid prey. The aphids were identified as *Rhopalosiphum rhois* Mon.; most of them were wingless.

On September 29 a small parasite larva was feeding on the chrysidid prepupa mentioned above. The other *Perithous* larvae, which had been feeding on the *Pemphredon* larvae, were now full grown and beginning to spin cocoons. The cocoons were completed a couple of days later and were of very delicate silken mesh. Four males of *Perithous mediator pleuralis* emerged from this nest on April 13, 14, and 16, and two males of *Omalus sinuosus* Auctt. on April 11 and 13, and one female of the *Omalus* on April 13. All cells of the host wasp were parasitized.

Reinhard (1929) reared *pleuralis* from nests of *Pemphredon concolor* Say in an old beech stump.

**Cubocephalus canadensis** (Provancher)

A male of this ichneumonid was reared from a prepupa of the tenthredinid sawfly *Hemitaxonus dubitatus* (Norton), *q. v.*

**Perilampus canadensis** Crawford

Two specimens of this perilampid emerged from cocoons of the sphecid *Ectemnius stirpicola* (Pack.), *q. v.*

**Diomorus zabriskiei** Cresson

Several specimens of this torymid were bred from cocoons of *Ectemnius stirpicola* (Pack.), *q. v.*

**Habritys latro** Wallace

Adult females of this pteromalid were found in nests of *Ectemnius stirpicola*, and a few were reared from cocoons of this wasp, *q. v.*

**Epistenia coeruleata** Westwood

This pteromalid is parasitic on prepupae of the vespid *Leptochilus republicanus scandaloides* (Robt.) nesting in sumach (Krombein 1959).

**Axima zabriskiei** Howard

This eurytomid was reared from prepupae of the apid *Ceratina calcarata* Robt., *q. v.*

**Omalus (Omalus) sinuosus** Auctt.<sup>1</sup>

This chrysidid was reared from *Pemphredon lethifer* (Shuck.), *q. v.*, and probably also from *P. harbecki* Roh. (see notes above under *Perithous mediator pleuralis* Cr.).

The cocoons are spun of semitransparent white silk and range from 4.6 to 5.1 mm. long. They are circular in cross section;

<sup>1</sup> This species has been misidentified as *sinuosus* (Say), 1828. It will be described as a new species by Bohart and Campos in a forthcoming revision.

the tail end is rounded and the head end truncate. Unlike the cocoons of some other species of *Omalus*, the head end of the cocoon of *sinuosus* Auctt. is no thicker than the walls, and is not composed of strands of silk spun in a fine, close spiral pattern.

### **Chrysis (Ceratochrysis) enhuycki** Cooper

This chrysidid is a social parasite of the vespid *Leptochilus republicanus zendaloides* (Robt.) nesting in sumach (Krombein 1959).

### **Leptochilus republicanus zendaloides** (Robertson)

Biological notes on this vespid, which nests in sumach, and its parasites were reported earlier (Krombein 1959).

### **Stenodynerus (Parancistrocerus) perennis perennis** (Saussure)

One nest (3759 B) of this vespid was found in a stem of staghorn sumach on March 7, 1959. On this date it contained vespid prepupae in frail, light tan, silken cocoons lining the cell walls. The nest was constructed in the upper end of a long pre-existing boring in the pith. The boring was 3-3.5 mm. in diameter and was closed off 35 mm. from the upper end by an earthen plug 3 mm. thick, constructed presumably by the mother *perennis*. Above this plug were three cells, 11, 11, and 13 mm. long, capped by earthen partitions 1 mm. in thickness. The lepidopterous remains in the cells were identified as mostly larvae of Blastobasidae and a few fragments of larvae of another family. One of the prepupae pupated between March 11 and 16, and an adult female of *p. perennis* emerged on March 30.

Rau (1935) also found typical *perennis* nesting in twigs, the cells separated by clay partitions. Krombein (*in* Krombein and Evans 1955) found *perennis anacardivora* (Roh.) also nesting in a twig and provisioning its cells with larvae of Olethreutidae and Gelechiidae.

**Pemphredon (Cemonus) harbecki** Rohwer

Two females of this sphecid wasp were recovered from the paper sacks in which I transported the stems from Dunn Loring to my office on August 28 and September 26. A third female (82858 B) was found, head outward, at the bottom of an otherwise empty boring in a stem of smooth sumach 6 mm. in diameter. The boring was 16 cm. long and 3 mm. in diameter. A nest, possibly belonging to this wasp, was described under *Perithous mediator pleuralis*, *q. v.* The aphid prey stored in this nest was *Rhopalosiphum rhois* Mon. All cells were parasitized by *Perithous* or by *Omalus sinuosus* Auctt. The type series of *harbecki* was reared from a nest in pith of elder (*Sambucus*).

**Pemphredon (Cemonus) lethifer** (Shuckard)

Two females of this species were recovered on September 11 and 19 from the paper sacks used for transporting stems on those dates.

One nest of *lethifer* (91958 C) was found in a stem of smooth sumach 7 mm. in diameter on September 19. This nest was not completely stored, and may have belonged to the female found loose in the paper sack. The boring was 150 mm. long and 2.5 mm. in diameter. The upper end was empty for 40 mm. Below this empty space were tightly packed aphids for 7 mm., then in succession a wasp egg placed across the boring, 12 mm. of tightly packed aphids and a small wasp larva, two full-grown wasp larvae devouring the last of the aphids provided for them, scattered small particles of pith for 15 mm., a large wasp larva beginning to spin its cocoon, and several prepupae in cocoons. The lower end was filled with fine particles of pith for 20 mm. The aphids were purple nymphs, 0.75–1.25 mm. long of a species of *Aphis*. The cocoons were 9–10 mm. long, and consisted of a silken cap above and a partition of tougher silk at the lower end which walled off the meconial pellets. Several of the prepupae and mature larvae were preserved for taxonomic study. The remaining prepupae pupated between April 1 and

6. Three males of *lethifer* left the boring on April 14, 15, and 16, and one female on the 17th.

Another nest (DL 3) was found in a stem of smooth sumach 9 mm. in diameter on January 4, 1958. This boring was sinuous, 2 mm. in diameter, and was closed by a plug of fine particles of pith. It contained several *Pemphredon* prepupae, and at the inner end two chrysidid cocoons, 6 and 4.5 mm. long, with aphid remains attached to the cocoons. Males of *lethifer* emerged on April 22 and 23, and a male of *Omalus sinuosus* Auctt. on the 24th. The other *Omalus* died as a fully colored pupa.

Rau (1948), referring to this species as *inornatus* Say, published a few notes on its biology. He found it nesting in hollow stems of *Weigelia* and provisioning with *Aphis gossypii* Glov.

#### *Passaloecus annulatus* (Say)

A nest of this sphecid wasp (92658 C) was found in a stem of smooth sumach 8-10 mm. in diameter on September 26. The boring was sinuous, 20 mm. long and 2 mm. in diameter. There was a thin plug of resin at the entrance. Beneath this were two cells 11 and 9 mm. in length separated by thin partitions of resin. The cells were stored with tightly packed aphid nymphs belonging to a species of *Macrosiphum*. A small wasp larva was present in each cell. Both larvae were nearly full grown on September 29, and spun their cocoons the next day. The cocoon consisted of just a delicate silken cap at the upper end of the cell spun adjacent to the resin partition. The meconium was voided as a long black ribbon. One of the larvae had deposited the meconium at the upper end of the cell next to the silken cap, and had then spun another silken cap beneath the meconium. One of the prepupae was preserved for taxonomic study. The other pupated a few days before March 31. It became fully colored but failed to eclose. It was readily identifiable as a male of *annulatus*.

Another nest (92658 D), found in smooth sumach on the same date, was probably a nest of *annulatus* also. It consisted of a single cell constructed in 20 mm. of boring above a pupation chamber of the sawfly *Hemiteaxonus dubitatus*. The cell was

13 mm. long and was capped by a thin partition of resin. There was an empty space of 6 mm. above the cell and then a thin closing plug of resin at the boring entrance. The wasp egg was injured when I opened the stem. The cell contained 26 tightly packed, pale green aphid nymphs, 1.3–2.5 mm. long, of the same species of *Macrosiphum* stored in the other nest of *annulatus*.

Krombein (1955, 1958) reported *annulatus* as nesting in deserted anobiid burrows in structural lumber and provisioning with nymphs of *Drepanaphis* sp., probably *acerifoliae* (Thos.) and *Macrosiphum* sp.

(*To be continued*)

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### Nomenclature Notice

All comments relating to the following should be marked with the Commission's File Number and sent in duplicate, before March 1st to W. E. China, Assistant Secretary, International Commission on Zoological Nomenclature, c/o British Museum (Natural History), Cromwell Road, London, S.W. 7, England.

Designation of a type species for the nominal genus **Bolitochara** Mannerheim, 1831 (Class Insecta, Order Coleoptera). Z.N.(S.) 243.

Designation of type species for the nominal genera **Ischnopoda** Stephens, 1835, and **Tachyusa** Erichson, 1837 (Class Insecta, Order Coleoptera). Z.N.(S.) 244.

For details see Bull. Zool. Nomencl. Vol. 17, Parts 3/5.